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May 29, 2007

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Bechtel SAIC Company, LLC
1180 Town Center Drive
Las Vegas, NV 89144

QA: NA

**SUBJECT: PRELIMINARY 2007 GEOTECHNICAL DRILLING RESULTS FROM THE
U.S.G.S. FOR THE WASTE HANDLING BUILDINGS AND AGING PAD AREAS**

Enclosed please find correspondence from the U.S. Geological Survey which provides discussion and figures of the original fault locations and revised locations after recent drilling results. The Lead Laboratory concurs with the preliminary interpretation of geologic fault projections based on information from recent drilling in Midway Valley. In addition, Lead Laboratory personnel will promote frequent discussions with other project participants regarding work prioritization, geologic interpretation, and design implications as new information becomes available.

If you have any questions, please contact Douglas Weaver at (702) 295-5916.


S. Andrew Orrell

SAO:ga

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United States Department of the Interior

U. S. GEOLOGICAL SURVEY

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IN REPLY REFER TO:

QA: N/A

May 21, 2007

Andrew Orrell, Senior Program Manager
OCRWM Lead Laboratory
Yucca Mountain Project
1180 North Town Center Drive
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Las Vegas, NV 89144

SUBJECT: Preliminary 2007 Geotechnical Drilling Results – for the Waste Handling Buildings and Aging Pad Areas, Yucca Mountain, Nevada

Mr. Orrell,

U. S. Geological Survey and Bureau of Reclamation personnel are participating in the interpretation of the on-going geotechnical drilling in Midway Valley in support of the surface facility design. Preliminary data from the recent drilling phase indicate the location of the Bow Ridge fault in northern Midway Valley may be farther east than projected from previous work in the area. This administrative letter describes recent results from drilling in the aging pad area that indicate the Bow Ridge fault lies beneath the western half of aging pad 17N (Fig. 1) and the northwestern corner of aging pad 17L. This interpretation is based on preliminary results from boreholes RF76DC, RF75DC, RF78DC, RF79, and RF80.

In the footprint of aging pad 17N, boreholes RF75DC and -76DC have been drilled to final depth. Borehole RF76DC is located in the northwest corner of the pad. The upper portion of the borehole was drilled in alluvium (to 131 ft) and the post-Tiva Canyon Tuff Rhyolite of Comb Peak (to 224.5 ft); the borehole encountered a fault zone from 224.5 ft to 248 ft, and continued into the Tiva Canyon Tuff from 248 to 267 ft. At this depth, the Tiva Canyon Tuff was identified as crystal-poor, lower nonlithophysal zone, indicating that about 250 ft of stratigraphic section has been omitted by the fault (rough approximation of fault displacement) from the Tiva Canyon Tuff in this borehole. Borehole RF75DC is collared in the center of aging pad 17N, and encountered densely welded, crystal-rich, Tiva Canyon Tuff at a depth of about 60 ft. Our interpretation is that RF76DC is in the hanging wall (down-dropped block) of a fault and RF75DC is in the footwall (upthrown block) of the fault. On the basis of these two boreholes, this fault is interpreted to have approximately 250 ft of down-to-the-west offset.

Within the footprint of aging pad 17L, three boreholes have been drilled (RF78DC, -79, and -80). RF78DC is in the center of the pad, and encountered the densely welded, crystal-rich Tiva Canyon Tuff at approximately 140 ft. Borehole RF79, in the northwestern corner of the pad, encountered the post-Tiva Canyon Tuff Rhyolite of Comb Peak at about 135 ft and the lithostratigraphic top of the Tiva Canyon Tuff at 200 ft. Borehole RF80 was collared in the southwestern corner of the pad and encountered the lithostratigraphic top of the Tiva at 127 ft.

Our interpretation is that boreholes RF78DC and -80 are in the footwall (upthrown block) and RF79 is in the hanging wall.

The attached plan view maps display the original mapping (Fig. 1) and the revised locations of faults (Fig. 2 & 3) based on recent drilling results. Originally, it was thought that the Bow Ridge fault was west of the proposed aging pads (Fig. 1); however, these preliminary drilling results indicate that a large down-to-the-west fault, that could be the Bow Ridge fault, is farther east than originally mapped (Fig. 2 & 3). The original fault location is based on the geologic map by Day and others (1998). This Geologic Investigations Series map shows the Bow Ridge as a "scissor" fault with down-to-the-west displacement west of Exile Hill (located about 1 mile south of the aging pads) and down-to-the-east displacement in the north near borehole WT-16 (Fig. 1). Day and others (1998) inferred a down-to-the-west fault east of WT-16, and based on recent drilling, this down-to-the-west fault has stratigraphic throw of approximately 250 ft and is positioned east of WT-16, RF77, and RF79 (Fig. 2 and 3); we interpret this fault as a possible northward projection of the down-to-the-west Bow Ridge fault that bounds the west side of the Exile Hill block. The originally mapped trace of the Bow Ridge fault (west of WT-16) is interpreted as an antithetic, down-to-the-east, hanging-wall fault.

If the new interpretation of the northward projection is correct, it requires some realignment of other faults that were shown on the Day and others (1998) map in the area to the north of Exile Hill. Both the down-to-the-east fault that lies west of borehole WT-16 and the down-to-the-east fault that bounds the east side of the Exile Hill block must intersect or truncate against the reinterpreted trace of the Bow Ridge fault. This potential zone of complex fault intersections has not been completely established by drilling, but the complexity of this area is borne out by drilling results at borehole RF61DC and RF63 (Fig. 2 & 3).

Our personnel have been participating in daily discussions about geologic interpretation, borehole prioritization, and design implications with the Lead Lab, Sample Management Facility, BSC site, BSC design, and DOE personnel. All of the information presented above has already been discussed informally with the each of these organizations to assure efficient coordination during execution of the drilling program. We plan to continue real-time interpretations of preliminary borehole results in order to best assist BSC with meeting the YMP schedule goals for LA. The final, reviewed interpretation of the geology of this area will be included in the BSC final geotechnical report for the waste handling buildings and aging pad areas, scheduled for the spring of 2008.

Reference cited

Day, W.C., Dickerson, R.P., Potter, C.J., Sweetkind, D.S., San Juan, C.A., Drake, R.M., II, and Fridrich, C.J., 1998, Bedrock geologic map of the Yucca Mountain area, Nye County, Nevada: U.S. Geological Survey Geologic Investigations Series I-2627, 1:24,000 scale, 1 plate with text. Available online at: <http://pubs.usgs.gov/imap/1998/i-2627/>

Sincerely,



Kenneth J. Skipper
Chief, Yucca Mountain Project Branch
U.S. Geological Survey

Enclosure:

Figure 1- Previous Local Structure Inferences

Figure 2- Current (May 2007) Structural Inferences

Figure 3- Composite of fig. 1 & fig. 2

CC with enclosure:

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